

LINUX

DEVELOPER'S RESOURCE

QuickStart
Guide inside



LINUX Developer's Resource CD-ROM

This 6 CD set includes the Metro-X servers from MetroLink, a "QuickStart" Install Guide and the following distributions:

- Red Hat 4.2 for Intel (installs kernel 2.0.30)
- Debian GNU/Linux 1.3.1 (installs kernel 2.0.30)
- Slackware 3.3 (installs kernel 2.0.30)
- JE Distribution and JF (Japanese FAQ's)
- Metro-X Server 3.1.8 from MetroLink
- Kernel sources to 2.0.30 and 2.1.50
- XFree86 version 3.3.1 from XFree86.ORG
- GNU archive from prep.ai.mit.edu
- Linux archives from tsx-11.mit.edu and sunsite.unc.edu
- Apache WWW for Linux versions 1.2.1 and ALPHA 1.3a.1
- Lesstif for Linux .80
- Complete on-line docs & HOWTO's (Installation Guide and Networking Guide)
- Commercial demos include: BRU, Lone Tar, Smartware, Flagship, Cockpit, Post.Office, Virtuflex, FontScope

On-line documentation includes the "Installation & Getting Started Guide" by Matt Welsh and the "Network Administrators Guide." Complete HOWTO docs on-line. All docs are provided in DOS & Postscript versions for printing.

These discs are mastered in ISO-9660 format with Rock Ridge extensions to preserve the long mixed case filenames and deeply nested directory structure. An alias file is provided in each directory for systems that do not support the Rock Ridge extensions.



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InfoMagic

LINUX



QUICKSTART
version 3.1

InfoMagic Linux Developer's Resource

QuickStart version 3.1 by Henry M. Pierce
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Based on:

"Linux Installation HOWTO" by Matt Welsh, mdw@sunsite.unc.edu

"RedHat-HOWTO" by Donnie Barnes, djb@redhat.com

Official Red Hat Linux User's Guide by RedHat Software, Inc.

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This document describes the process for installing the Linux operating system, focusing on the popular RedHat and Slackware distributions for Intel based computers, as found on the InfoMagic Linux Developer's Resource CD-ROM set. It is the first document which a new Linux user should read to get started.

Please refer to the file `README.1st` on Disc 1 for the directory layout and to file `ls_lr` for a complete listing of all files found on the entire CD-ROM set.

1.0 INTRODUCTION

Linux is a freely-distributable implementation of UNIX™ for 80386, 80486, Pentium and Dec Alpha processors based on the work done by Linus Torvalds and 1000's of UNIX enthusiasts everywhere. Linux supports a wide variety of traditional UNIX™ software including X-Windows, TCP/IP Networking (Ethernet, token-ring, PPP, and SLIP), Compilers (C, C++, Lisp, etc.), Text Editors (vi, EMACS, etc.), Games, the works. This document assumes that you know what Linux is and want a quick guide to sit down and install it. You will need to decide if you want to install RedHat or Slackware (but not both). RedHat may be found on the CD-ROM labeled RedHat, and Slackware on the CD-ROM labeled Slackware.

1.1 Other Sources of Information

If you have never heard of Linux before or would simply like more information about Linux, there are many excellent books on Linux as well as the following sources on the Internet:

World Wide Web:

<<http://www.linux.org>>
<<http://www.infomagic.com>>

USENET News:

comp.os.linux.misc
comp.os.linux.setup
comp.os.linux.hardware
comp.os.linux.announce
comp.os.linux.advocacy

Two series of documents available on the web and in the \DOCS directory on InfoMagic's CD-ROM set, are the FAQ (Frequently Asked Questions) and the "HOWTO" documents. These documents cover many frequently asked questions and answers as well as provide extensive help with pertinent topics on installing, configuring and using Linux. Whether a novice or a computer guru, if you need more extensive information on Linux, the FAQ's and HOWTO's are a good place to start.

1.2 Feedback

If you would like more information on InfoMagic's latest Linux products, please send email to info@infomagic.com or check our WWW page <http://www.infomagic.com>. For technical questions, feed back on this document or the CD-ROM set please contact us at support@infomagic.com or check our WWW page,

<<http://www.infomagic.com/support/linux>>. For other technical support options, please see the section "Technical Support Information" found at the end of this guide.

2.0 OVERVIEW OF INSTALLING LINUX

This document outlines the process of successfully installing Linux and some basic differences between RedHat and Slackware. RedHat and Slackware are referred to as "distributions" of Linux. A distribution of Linux refers to the combination of software and philosophy of what a UNIX system should be that builds around Linus Torvalds' Linux kernel. The kernel is the heart and soul of a Linux distribution coordinating your hardware into a useful lump of equipment. The decision to install RedHat or Slackware comes down to a combination of your target hardware and personal preferences. This document assumes Linux will be installed on the same hard drive as MS-DOS/Windows 95 and that you will have one Linux native partition and one swap partition. You will need one MS-DOS formatted floppy to use FIPS.EXE and either one MS-DOS formatted floppy to install RedHat™ (two floppies are needed for laptops with PCMCIA support) or two MS-DOS formatted floppies to install Slackware™ from CD-ROM.

2.1 Summary of Hardware Requirements

A basic Intel based PC should consist of a combination of the following: An i386, i486, i586 or higher processor installed on an ISA, VESA or PCI based mother board with 8 megabytes of RAM or greater; a 5.25" 1.2MB (Slackware Only) or 3.5" 1.44MB floppy drive; An AT-standard hard disk (most MFM, RLL or IDE based hard drive and controllers) or SCSI hard drive with supported SCSI controller; and a supported proprietary 2X CD-ROM drive such as a SoundBlaster, Panasonic, Sony cdu31a/33a, Mitsumi 2X drive or any standard IDE/ATAPI or SCSI (with supported SCSI controller card) CD-ROM drive. Almost any standard CGA, EGA, VGA or SVGA video card will support Linux's text based mode. For X-Window compatibility, please check the XFree86-HOWTO. For a detailed list of supported hardware, please check the Hardware-HOWTO or `comp.os.linux.hardware`.

TIP: IDE/ATAPI CD-ROMS are an industry standard. If you have a SoundBlaster, Mitsumi, or other recently made 4X speed or higher CDROM drive, you most likely have a IDE/ATAPI based CD-ROM. Many of these drives are configured as slave and don't get detected by Linux. These drives must be set as Master if they are the only drive on an IDE interface.

2.2 Summary of Space Requirements

Depending on your needs, goals, the distribution and your hardware, Linux can be installed in as little as 100MB of drive space or as much as 350MB or greater. A minimal installation would consist of the base installation of the distribution you pick (default for RedHat and the "A" series for Slackware), basic applications, network support, C programming support and the kernel source tree. A full installation of about 250MB would include the X-Window system, additional applications, a web server, and additional software development support (C++, PERL, Pascal, FORTRAN, etc.). You should also factor in a 16MB swap partition (the minimum recommended) and an additional 25-50MB space for your own files.

2.3 Summary of Installing Linux

Linux does not rely on any operating system such as MS-DOS, Windows 95 or OS/2 being installed on the target computer, and normally resides on its own "native" partition. While Linux is a stand-alone operating system, it may co-exist with another operating system such as MS-DOS or Windows 95 on the same hard drive. It may also be installed on a second hard drive or be installed as the only operating system on the computer.

The process of installing Linux involves the following: deciding which distribution to install; preparing the hard drive for Linux; creating a set of boot and root disks for the distribution to be installed; using the distribution's installation software; and finally, booting and using the newly installed Linux system.

TIP: You should know the brand and model of every device attached to your computer as well as all of the jumper settings for each card (i.e. the IRQ and I/O port addresses). If trouble occurs, having this information easily available will help trouble shoot the problem(s).

3.0 SETTING UP YOUR HARD DRIVE WITH FIPS.EXE

NOTE: Please check under the "System Performance" control panel and see if the system is "4.00.950B". If you are using this version of Windows 95, you cannot use FIPS.EXE.

Most people installing Linux will have one hard drive with a single MS-DOS or Windows 95 partition that uses the entire drive. Not to worry though, InfoMagic's CD-ROM set comes with a handy utility called fips which will allow you to "shrink" your MS-DOS or Windows 95 partition and free up hard drive space for a Linux native and swap partition. You can only use FIPS with a DOS or Windows 95 FAT partition. Before

going any further, **BACKUP** the existing system before running **fips** or installing Linux. You should also read **FIPS.DOC** which will provide more detailed information about FIPS. While it is extremely rare to completely lose an existing partition, it might happen and a backup will ease the recovery of such an event. To locate **fips.exe**, please check the file **ls_lr** on Disc 1 of the CD-ROM set. To use **fips**, use the following steps:

1. Copy **fips.exe** to your C: drive into a directory such as C:\WINDOWS or C:\DOS.
2. Create a bootable DOS or Windows 95 floppy disk and place **RESTORRB.EXE** from the FIPS directory on the CD onto the bootable disk.
3. Run **scandisk** and **defrag** (included with DOS 6.X and higher). This places all free space at the end of the drive so **fips** can create a second partition.
4. Make sure you are in DOS mode (i.e. Not running Windows 3.X or Windows 95). Windows 95 users: remember you can choose re-boot into DOS mode from the shutdown menu.
5. Type '**fips**'. An introductory message will be shown and with a choice for which drive to shrink. Most people will choose partition "1" to be split.
6. After confirming that you wish to continue, you will be asked to make a backup copy of your existing boot and rootsectors on the bootable disk made above. This will allow you to restore the hard drive if needed.
7. FIPS will ask if all the available free space should be used and present an initial partition table dividing the hard drive into two partitions. If you say 'no', you can use your UP and DOWN arrow keys to adjust the amount of space freed. Hit ENTER to continue. If the sizes with the new partition table are acceptable, choose 'c' to continue. If not, choose 'r' to re-edit the table.
8. One last chance will be given to quit FIPS or write out the new partition table. If you are happy, write it out!
9. Once FIPS is done, re-boot your machine.
10. Next, use DOS's **fdisk.exe** to delete the second partition. Linux's **fdisk** will be used later to create the Linux native and swap partitions in the freed hard drive space.

4.0 THE REDHAT INSTRUCTIONS

RedHat™ provides several methods of installation. The CD-ROM based methods of installing are covered in

this document. Overall, RedHat has simplified the installation process with the use of a one-floppy “fits all” (RedHat only supports 3.5”, 1.44 floppies) installation as well as a floppy-less install when installing via a CD-ROM. Both methods use an identical install program which supports installing a new system and/or upgrading an existing RedHat 2.0 or higher to RedHat version 4.0. Technically, RedHat should run on an i386 based machine with 4MB of physical memory. However, the practical minimum is a i486DX/66 with 8MB of physical RAM and a 2X or higher supported CD-ROM drive and 250MB to 350MB of hard drive space. Please read the RedHat-HOWTO and the RedHat-FAQ for more information. The RedHat Linux distribution is located on the CD-ROM labeled RedHat.

4.1 Upgrading an existing RedHat Installation

RedHat™ provides two methods of upgrading: running the install program directly from the CD-ROM or using a 1-floppy install (RedHat only supports 3.5”, 1.44MB floppies). Regardless of the installation method chosen, the install program will provide the option of upgrading RedHat Linux 2.0 or higher to RedHat Linux version 4.X. The 1-floppy install will be emphasized in this document.

4.2 Installing RedHat Linux via the floppy-less install

RedHat Linux provides the ability to run the install program directly off the CD-ROM drive. This method will support both installing a new system and upgrading an existing system. Almost any 2X speed or higher CD-ROM drive supported under Linux should work. However, if the install program will not boot properly from the CD-ROM drive, you should try the one floppy install instead. To start the install directly from the CD-ROM drive, you must be in DOS mode: either quit Windows 3.1 or use the “Restart computer in MS-DOS mode” option under the Windows 95 shutdown menu. From the DOS prompt (assuming your CD-ROM drive is the D: drive), type:

```
C:\> D:
```

```
C:\> cd\dosutils
```

```
C:\> autoboot
```

At this point, the same setup menu provided by the one-floppy install will be presented upon successful boot-up from the CD-ROM drive.

4.3 Creating the RedHat Boot Diskette

One blank DOS formatted floppy will be needed to create the boot diskette used for either installing or upgrading RedHat Linux. Starting with RedHat 4.0, a “one disk fits all” strategy is employed to install or

upgrade RedHat Linux from the CD-ROM. This diskette image contains the kernel and the module support for most combinations of hardware. The image, `boot.img`, is located in the `\images` directory on the RedHat Linux CD-ROM. The DOS utility, `rawrite.exe`, is used to create the floppy and `rawrite.exe` can be found in the `\DOSUTILS` directory on the RedHat CD-ROM. Please copy `rawrite.exe` to `C:\DOS` or `C:\WINDOWS` directory which will place the `rawrite` utility in your command path. From the CD-ROM (presuming it is the D: drive), type:

```
D:\DOSUTILS> copy rawrite.exe c:\WINDOWS
```

Once `rawrite` has been copied to the `C:\DOS` or `C:\WINDOWS` directory, do the following to create the boot disk:

```
C:\> D:
```

```
D:\> cd \images
```

```
D:\images> rawrite
```

```
Enter disk image source file name: boot.img
```

```
Enter target diskette drive: a:
```

```
Please insert a formatted disk into drive A: and press -Enter-:
```

Once `rawrite` is done creating the boot disk, remove the floppy from the floppy drive and label it "RedHat Boot Diskette". Remember, RedHat Linux 4.0 uses a "one disk fits all" strategy so you don't have to worry about matching a boot image to your hardware. Once the floppy is labeled, re-insert it into the diskette drive and re-boot your system. You are now ready to install RedHat Linux!

4.3.1 Creating the RedHat Supplemental Diskette

The supplemental disk is only needed if you are installing to a laptop and need PCMCIA support. This diskette image is located in the `\images` directory on the RedHat CD-ROM. While the following types of installations are not covered in this document, the supplemental disk is also required for hard drive and FTP installs. For CD-ROM installs, the supplemental disk is required for laptops which require PCMCIA support for the CD-ROM drive and/or floppy. Please follow the instructions for "Creating the RedHat Boot Diskette" except substitute "supp.img" for "boot.img".

4.4 Install RedHat

RedHat Linux's installation program is easy to use and starts up automatically. The setup program is self-explanatory. TIP: If you do not have an Ethernet Card, DO NOT configuring networking when asked by the setup program. The RedHat setup program will proceed as follows:

1. You will be asked if you have a color screen (if you do, press "OK"), you will then be introduced to RedHat and asked if you need PCMCIA support (say "No" unless you are installing to a laptop and have the supplemental diskette already made).
2. Next, you will be prompted for the installation media, presumably, "Local CDROM". You will then be asked a series of questions about your CD-ROM hardware. The options are: IDE/ATAPI, SCSI or proprietary CD-ROM drive. Choose the appropriate option for your hardware. TIP: Most recent 4X speed or faster CD-ROM drives are IDE/ATAPI.
3. Next, you will be asked if you are installing to a New System or Upgrading RedHat 2.0 or higher. If you are upgrading, you will not be offered the chance to partition your hard drive or configure anything with your system except LILO.
4. If you are installing for the first time, you will need to partition your hard disk. You will need to highlight the hard disk you wish to partition. Please see "Appendix A" for the use of Linux's fdisk program. If you do not have any free space on your hard disk to create partitions, please review the "SETTING UP YOUR HARD DRIVE WITH FIPS.EXE" section of this document.
5. Once you have created the necessary Linux Native and Linux Swap partitions, setup will ask you to configure your Swap partition. You should do so as it will speed the installation. You will then be asked which partition(s) you intended to install Linux to: You must configure and choose one partition for the "root" partition. If you have more than one partition for the Linux installation, now is the time to designate them as well.
6. Next is the Software Package Selection. First, a list of software categories to install is presented, followed by a chance to customize which software packages from each category is to be installed. If you have not installed RedHat or other distribution of Linux before, you should let the setup program install the defaults. While the software is installing, you will see a progress indicator and should get a cup or two of coffee. Installation can take anywhere from 30min. to an hour or so depending on software choices and hardware configuration.
7. After the software installation is done, you will be asked to configure you mouse. Again, choose what is appropriate for your hardware.
8. Next is the X-Window configuration. We recommend you wait until after you boot your system for the first time to configure X-Window. If something goes wrong with the X-Window configuration, you may need to start the installation procedure from the beginning.

9. If you do not have an Ethernet Card, DO NOT configure your network at this time. If you do have a network card and didn't configure it earlier, you should configure it now.
 10. Next, you need to configure the system clock. UTC is a good choice if you are on a network and want daylight savings time handled properly. Local Time is good if this is a stand-alone machine.
 11. If you do not have a US Keyboard, you will need to configure for the keyboard you have at this time.
 12. You will now be prompted for the system password for the account "root ". Write it down and don't forget it as it is a non-trivial matter to recover the password.
 13. Finally, you will be asked to configure LILO. Please see Appendix B for LILO information.
- Once the installation procedure is completed, you are ready to re-boot your system and use Linux!

5.0 THE SLACKWARE INSTRUCTIONS

Slackware is located on the CD-ROM labeled "Slackware". To install Slackware, you will need to create one boot disk and one root disk. Slackware organizes its software packages into "Disk Sets" which is a term that originates from the days when Slackware was installed from floppy disks. The disk sets organize the software into the following groups: A: the base system; AP: text based applications and utilities; D: development software such as compilers, libraries, etc; E: GNU EMACS; N: networking utilities and servers; K: the kernel source tree; T: Tex and LaTeX document processing system; TCL: the TK/TCL scripting languages; X: base X-Window System; XAP: X-Window applications; XD: X-Window software development packages; XV: xview development system and the Open Look Window Manager; Y: games that do not require X-Window.

Slackware needs at least 4MB of RAM and 100-150MB of disk space with a 16MB swap partition to be useful. A minimal installation would consist of the A, AP, D, N and K disk sets. An installation including X-Window will need 8MB of RAM and about 250-300MB of disk space with a 16MB swap partition. Such an installation might consist of the A, AP, D, E, N, K, TCL, X, XAP and Y disk sets. Also, unlike RedHat, Slackware does not support in-place upgrades and should be installed from scratch. If you are upgrading from a previous release of Slackware, please consult UPGRADE.TXT found on the Slackware CD-ROM for more information.

5.1 Creating Slackware Installation Disks

Slackware requires one boot disk and one root disk. The boot disk contains the Linux kernel which boots your system. The root disk contains the setup program and other tools needed to successfully install

Slackware. The DOS utility `rawrite.exe` will be used to create the boot and root floppy disks. This utility is normally located in the `\install` directory on the Slackware CD. Please copy `rawrite.exe` to your `C:\DOS` or `C:\WINDOWS` directory which will place the command in your command path. From the CD-ROM (presuming it is the D: drive), type:

```
D:\UTILS> copy rawrite.exe C:\WINDOWS
```

You are now ready to create your boot and root disks.

5.2.1 Creating the Slackware Root Disk

The root disk images are in the `rootdsks` directory on the Slackware CD. This document covers the use of the `color.gz` root disk which provides a nice menu driven interface. NOTE: Older versions of Slackware required that the root disk image be decompressed. However, beginning with Slackware 3.0, the root disk must remain compressed! The rootdisk images in the `\rootdsks` directory are used with both 3.5" and 5.25" floppy drives. Assuming your CD-ROM drive is the D: drive, you need to type the following:

```
C:\> D:
```

```
D:\> cd \rootdsks
```

```
D:\> rawrite
```

```
Enter disk image source file name: color.gz
```

```
Enter target diskette drive: a:
```

```
Please insert a formatted disk into drive A: and press -Enter-:
```

Once this is done creating your root disk, remove the diskette and label it "Slackware Color Root". You are now ready to make your boot disk!

5.2.2 Creating the Slackware Boot Disk

InfoMagic normally places the boot disk images in `\bootdsks.12` (for individuals with a 1.2MB, 5.25" Floppy drive) and `\bootdsks.144` (for individuals with a 1.44MB, 3.5" floppy). You will need to decide which boot image you need for your hardware. All Slackware boot disks support IDE hard drives, IDE/ATAPI CD-ROM drives, SLIP, and PPP. The boot disk images that end in an ".I" are IDE only boot disks with support for various proprietary CD-ROM drives. The boot disk images that end in an ".S" contain various mixtures of SCSI card support and proprietary CD-ROM drive support. The only images with Ethernet support are `NET.I` and `SCSINET.S`. To determine which boot image you need, please use a word processor or text editor to view the `WHICH.ONE` file in the `bootdsks.144` or `bootdsks.12` directory. For example, if you need IDE hard drive support, IDE/ATAPI support, PPP support but do not need Ethernet support, you would choose `bare.i`.

To create the boot disk, type the following:

```
C:\> D:  
D:\> cd \bootdsk.144  
D:\> rawrite  
Enter disk image source file name: bare.i  
Enter target diskette drive: a:  
Please insert a formatted disk into drive A: and press -Enter-:
```

Once rawrite is done creating the disk, remove the disk, label it "Slackware Boot" and re-insert the disk into your disk drive. You are ready to re-boot your computer and install Slackware! When rebooting, you will be greeted with an introductory message and a boot: prompt. If you think you need to provide some extra parameters to get your hardware detected, type them here. Otherwise, press return. When prompted for the ramdisk, switch disks and insert the Root disk.

5.3 Installing Slackware

Now that you have booted with your installation disks, you should now be at the slackware login: prompt. Enter "root" here and you will be given the shell "#" prompt. At this point, the installation proceeds as follows:

1. You will need to partition your disk with Linux's fdisk at this time. Please consult Appendix A for details on this.
2. Once the hard drive has been partitioned, type "setup"
3. With the color install program, a menu of options will appear. Each of these options is used to accomplish an installation task and each task builds on the other. **IMPORTANT!** If you restart the installation program for any reason, you must start from the beginning. Generally, most people will want to start with ADDSWAP and proceed from there. Once you are done with a task, you will be asked to go to the next task or return to the main menu. The install proceeds in the following order:

ADDSWAP: Scans for a Linux Swap partition and prompts you to use it. Remember, if you quit the setup program for ANY reason, you must restart here. The setup software collects information about which partitions are being used and for what into a file called `/etc/fstab`. This file is installed as one of the last steps and informs the installed Slackware Linux how to use the various partitions on your hard drive. If you have to restart the setup program, you have to have setup re-build this file.

TARGET: This option scans for all Linux native partitions, asks which Linux Native partitions you wish to use and asks you to format the Linux partition. This informs the installation program where to install

software and adds the partition to `/etc/fstab`. You must select one partition for the root partition.

SOURCE: This allows you to select your CD-ROM drive as the source.

DISK SETS: The allows you to choose the software packages to be installed. The "A" disk set is the minimum package that must be installed.

INSTALL: This allow you to choose the software with in a disk set. If you are new to Slackware or Linux, you should choose the NORMAL install which will describe in detail what each of the software packages do. If you have installed Slackware before, choose MENU which will only list a summary description of each package to be installed.

CONFIGURE: Once everything is installed, some basic system configuration needs to be done. First, you will be given the option to install the kernel from the boot disk: most people should do this. However, if you need Ethernet support after you have installed Linux, you should choose the **NET.I** or **SCSINET.S** from the CD-ROM. You will then be asked to configure your Mouse and Modem port. Next, you will be given the option to use a silly screen font instead of the default. Next, you will be prompted for your Modem speed. You will then be given the chance to configure LILO. Please see Appendix B for information on using LILO. Next, you will be asked to configure your Network. If you plan to use SLIP/PPP, then you need to configure your network for LOOPBACK only. Finally, you will be asked if you want to use GPM: say no if you intend to use the X-Window system.

Remember, each of these tasks build on each other and allow the setup program to collect information about your configuration needed to boot the installed system properly. Once they are done, you are ready to reboot and use Slackware Linux!

APPENDIX A: USING FDISK

To create Linux partitions on a hard drive with free space (see the section on FIPS), the version of `fdisk` supplied by Linux will be used. This version of `fdisk` is not used under DOS but from within Linux. This implies that you should only create or delete partitions with the version of `fdisk` that comes with the operating system you are manipulating partitions for. That is, only create and delete DOS partitions with DOS's `fdisk` and only create and delete Linux partitions with Linux's `fdisk`.

Partitions Under Linux

Before using Linux's `fdisk`, you should have an understanding of how Linux labels and uses drive partitions. To Linux, partitions are given a name based on the disk on which the partition resides. That is, the device (drive) is considered first followed by the partition contained on the device. For example, `/dev/hda` refers to the first physical IDE hard disk (`/dev/sda` refers to the first physical SCSI disk) and `/dev/hda1` (or `/dev/sda1`) refers to the first partition on the first hard disk. Linux labels hard drives in the order they are configured on your system: So, `/dev/hdb` refers to the second physical IDE drive and `/dev/sdb` refers to the second physical SCSI hard drive. This is in contrast to DOS, where two partitions on the same disk are seen as "logical" drives such as C: and D:, or C: and D: could also refer to two physically distinct drives as well. This is a powerful feature of Linux because you can put different parts of the operating system on different partitions (and/or drives) but have all the partitions appear as one directory tree hierarchy. This can assist in meeting hardware limitations as well as managing the installed system. For example, `/dev/hda2` could be defined as a "/" (root) partition and `/dev/hda3` could be defined as a "/usr" partition. When the Linux system is booted, it does not matter that "/" and "/usr" are on different partitions in the sense of DOS as Linux treats the partitions as part of the same directory hierarchy instead of logical drives C: and D:.

Using `fdisk`

Linux's `fdisk` is fairly easy to use. `fdisk`, by default, will want to partition `/dev/hda`. From Slackware, to partition any other drive such as `/dev/hdb`, you need to type:

`fdisk /dev/hdb`

Within RedHat's software, `fdisk` is automatically informed of which drive you wish to partition. When `fdisk` is first started, you will receive a command prompt. By entering 'm' you will get a list of available commands for `fdisk`. However, the most useful one to start with is 'p':

Command (m for help): p

Disk /dev/hda: 32 heads, 63 sectors, 1024 cylinders

Units = cylinders of 1024 * 512 bytes

Device	Boot	Begin	Start	End	Blocks	Id	System
/dev/hda	*	1	1	49	100160	06	DOS 16-bit >=32M

To add a swap partition, use the 'n' command:

Command (m for help): n

Command action
 e extended
 p primary

p

Partition number (1-4): 2

First cylinder (50-1024): 50

Last cylinder or +size or +sizeM or +sizeK (50-1024): +16M

This will create a Linux Native partition 16MB in size. This is required if you have less than 16MB of physical RAM. The general rule of thumb for installations with 16MB or more of physical RAM is 2X physical RAM. Next, the partition must have its ID type changed to Linux swap with the 't' command:

Command (m for help): t

Partition number (1-4): 2

Hex code (type L to list codes): 82

If you use the "L" command, you will get a list of partition types and the ID numbers they use. You will discover a Linux native partition is type '83' (the default type fdisk makes) and type '82' for Linux swap partitions. Now that the swap space has been created, the primary Linux native partition needs to be created with the 'n' command:

Command (m for help): n

Command action
 e extended
 p primary

p

Partition number (1-4): 3

First cylinder (54-1024): 54

Last cylinder or +size or +sizeM or +sizeK (54-1024): +250M

This will create a Linux Native partition of about 250MB which is the minimum needed by RedHat or Slackware if you intend to run X-Window. At this point, we have not saved the changes to the partition table so if the 'q' command is given, fdisk will quit without saving these changes to the partition table. However, since we have gotten this far, we will want to review the partition table (using the 'p' command) and assum-

ing the partition layout is satisfactory, use the 'w' command to write the table out to the hard drive:

Command (m for help): p

Disk /dev/hda: 32 heads, 63 sectors, 1024 cylinders

Units = cylinders of 1024 * 512 bytes

Device	Boot	Begin	Start	End	Blocks	Id	System
/dev/hda1		1	1	49	100160	06	DOS 16-bit >=32M
/dev/hda2		50	50	54	16016	82	Linux Swap
/dev/hda3		54	54	1024	260160	83	Linux Native

Command (m for help): w

A Summary of the action fdisk takes will be printed out followed by a message to re-boot the computer. The computer should be re-booted at this time to ensure the partition table is properly written. When the option to partition the hard drives comes back up within the setup program, simply indicate that the drives do not need to be partitioned again.

APPENDIX B: USING LILO

LILO (Linux LOader) is a boot loader used by RedHat and Slackware which can be used to boot into either Linux, MS-DOS, Windows 95 or other operating systems. LILO can function either as a first stage boot loader (when stored in the MBR (Master Boot Record) of the drive) or second stage boot loader (when stored in the boot sector of a partition). It can also load Linux from a floppy. There are several considerations that need to be made when using LILO to manage a computer system including how the system is setup and if any other boot managers are present.

The first consideration is how the partitions are setup. Due to early design limitation in the PC, the BIOS of most PC's is only able to boot partitions on the first 2 physical drives that reside within the first 1024 cylinders of the drive in question. This means if you have three 1.2 gigabyte IDE hard drives, you are limited to booting partitions on the first two hard drives with partitions in the first 512MB of the drives.

However, most machines with a BIOS manufacture date of about June 1994 or later support a mode called LBA (Logical Block Addressing) which trades off the number of physical cylinders with the number of physical heads in a disk drive for determining the disk geometry. There are also some EIDE cards that allow machines with older BIOSes to employ LBA mode as well. The "solution" works by having BIOS report a

bogus geometry when queried for information about the drive by halving (or quartering) the actual number of cylinders and doubling (or quadrupling) the actual number of heads. By enabling LBA mode, a hard drive with 2048 physical cylinders and 16 physical heads, will be reported as having 1024 cylinders and 32 heads. This allows LILO calculate the correct geometry for booting a partition on the hard drive, but works within the restrictions placed upon the PC due to the engineering limitations. The Linux kernel does not have this limitation as it ignores BIOS and gets the geometry directly from the hard drive. But, we are reliant on LILO to start the kernel so we are restricted a bit in how the system can be organized. For more information, please consult the LILO-HOWTO.

A second consideration is whether you are already using another boot loader such as that provided with OS/2 or Windows NT. In this case, you will need to install LILO to the boot sector of Linux's root partition and have the OS/2 or NT loader load the Linux partition. In either case, if your Linux partition (or other bootable partitions) does not reside in cylinders 0-1023, DO NOT INSTALL LILO.

While RedHat and Slackware's interface to setting up LILO is slightly different, they both prompt you with the following questions:

1. When asked for any additional boot parameters, most people can skip this unless you need to type something at the boot: to get all of your hardware recognized.
2. You will be asked to designate each partition you wish to have LILO boot for you.
3. You will be asked to give each partition a unique identifying name for LILO. For example, you might want to use "linux" for you linux partition and "DOS" for your DOS partition.
4. You will then be given one last chance to decide if you want to install LILO. Presumably, you will want to install it.

If LILO does not start your computer properly for any reason (or you decide to remove Linux from your system), and you have an emergency DOS or Windows 95 boot disk, you can remove LILO by booting into DOS or Windows 95 and type:

```
C:\> fdisk /mbr
```

This will remove LILO from the MBR and replace it with DOS or Windows 95 boot loader and allow the system to boot as it did before the installation of Linux. As for Linux, should this happen, the boot installation disk should be used to boot Linux off the hard drive to help figure out what went wrong with the installation

of LILO. Using the RedHat boot supplemental disks, you will want to type the following at the boot: prompt

boot: rescue

For Slackware, you will want to type:

boot: ramdisk ro root=/dev/???? ramdisk=0

Where /dev/???? is the root partition you installed Linux to. While booting from a floppy in this manner is slow, it will allow you to startup the system and examine what went wrong. This is also a valid way to simply boot Linux from a floppy. To trouble shoot LILO problems, please consult the LILO-HOWTO.

APPENDIX C: INSTALLING THE METRO-X SERVER

InfoMagic is pleased to include the MetroLink Metro-X X-Window server on the Linux Developers Resource. This server has support for video cards not supported by the standard X-Window System supplied by the X-Consortium and may provide enhanced performance over the standard X-Consortium servers for supported cards. To install the Metro-X server, mount the CD-ROM labeled "Metro-X" using the one of the following commands:

For RedHat: **mount -t iso9660 /dev/cdrom /mnt/cdrom**

For Slackware and Debian: **mount -t iso9660 /dev/cdrom /cdrom**

Once the cdrom is mounted Red Hat users can type:

rpm -Uvh --replacefiles /mnt/cdrom/metrolink/metroess*.rpm

to install Metro-X. Slackware and Debian users should type:

cd /cdrom/metrolink

./install.metroess.

Once the install is complete, the configuration utility is "configX". Please see the README in the Metrolink directory for details.

APPENDIX D: TECHNICAL SUPPORT INFORMATION

InfoMagic is pleased to provide unlimited technical support by email for installation issues to help you get Linux installed and running on your system. Other issues will be addressed as well, however, installation support has priority. Each incoming email message will be automatically assigned a tracking number. World

Wide Web users should check out <<http://www.infomagic.com/support/linux>> for information on common problems and solutions in regards to installation and configuration of Linux.

Phone support is available for \$US 2.00 per minute in the continental USA at 1-900-786-5555.

We provide limited support for configuring X-Windows via email due to the overwhelming number of combinations of video cards and monitors. If you call for X-Windows configuration support, please have the horizontal and vertical sync frequencies of your monitor available as well as the brand and model of your video card. Without this information, we will be unable to assist with getting X-Windows up and running.

Feel free to contact us for other support options including remote system maintenance and management contracts and support for International Customers.


When contacting InfoMagic Technical Support by phone or email, please have the following information available to help us assist you faster:

- The Month and Year of the Linux Developer's Resource CD Set you are contacting us about
- Manufacturer and model of Your computer
- Number, type, capacity and geometry of your hard drive
- Manufacturer, model, I/O port and IRQ information on all installed cards (especially CD-ROM drives, SCSI and sound interface cards)
- Complete text of any error messages

It is also helpful if you can be near your system when you call as we will often ask you to check configuration details or manually adjust the system startup files. Please address e-mail support questions to: support@infomagic.com

Please do not send tech support questions to info@infomagic.com or call the 800 number. You will only be referred to the above email and technical support phone numbers! These support options supersede all previous options offered by InfoMagic, Inc.

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1

Red Hat 4.2
Red Hat Contrib
Metro-X 3.1.8
kernel sources
lesstif, HOWTO,
FAQ

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Slackware 3.3
GNU, JF

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3

Debian 1.3.1
Ptolemy, JF,
XFree86-3.3.1
pt 1, Demos

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Debian source
XFree86-3.3.1
pt 2, LDP,
Apache

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Red Hat source
TSX-11,
Sunsite pt 1

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